inclusive, shown in SEQ ID NO: [1] 3, is replaced with a replacement amino acid residue which is volumetrically larger than the replaced amino acid residue.

2. (Once amended) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 43, as represented by SEQ ID NO: 3, residue 4.

3. (Once amended) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 52, as represented by SEQ ID NO: 3, residue 13.

4. (Once amended) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 53, as represented by SEQ ID NO: 3, residue 14.

5. (Once amended) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 54, as represented by SEQ ID NO: 3, residue 15.

6. (Once amended) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 55, as represented by SEQ ID NO: 3, residue 16.

7. (Once amended) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 59, as represented by SEQ ID NO: 3, residue 20.

15. (Once amended) In an *E. coli* RecA protein or a protein having a MAW motif homologous to the *E. coli* MAW motif, a manufactured RecA homolog protein mutant, wherein a naturally occurring amino acid residue located within the protein's homolog of *E. coli* residues 40 to 65, shown in SEQ ID NO: [1] 3, inclusive, but excluding the protein's homolog of *E. coli* residues 47 and 51 (SEQ ID NO: 3, residues 8 and 12), is replaced with a replacement aromatic amino acid residue.

16. (Once amended) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 40, as represented by SEQ ID NO: 3, residue 1.

17. (Once amended) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 42, as represented by SEQ ID NO: 3, residue 3.

18. (Once amended) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 44, as represented by SEQ ID NO: 3, residue 5.

19. (Once amended) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 50, as represented by SEQ ID NO: 3, residue 11.

20. (Once amended) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 56, as represented by SEQ ID NO: 3, residue 17.

27. (Once amended) In an *E. coli* RecA protein or a protein having a MAW motif homologous to the *E. coli* MAW motif, a manufactured RecA homolog protein mutant, wherein a naturally occurring amino acid residue located at the protein's homolog of *E. coli* residues 47 or 51, shown in SEQ ID NO: [1] 3, (residues 8 or 12), is replaced with a tryptophan residue.

Claims 1-7, 15-20, and 27 are restated below, as amended:

1. (Restated) In an *E. coli* RecA protein or a protein having a MAW motif homologous to the *E. coli* MAW motif, a manufactured RecA homolog protein mutant, wherein a naturally occurring amino acid residue located within the protein's homolog of *E. coli* residues 40 to 65,

inclusive, shown in SEQ ID NO: 3, is replaced with a replacement amino acid residue which is volumetrically larger than the replaced amino acid residue.

2. (Restated) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 43, as represented by SEQ ID NO: 3, residue 4.

3. (Restated) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 52, as represented by SEQ ID NO: 3, residue 13.

4. (Restated) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 53, as represented by SEQ ID NO: 3, residue 14.

5. (Restated) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 54, as represented by SEQ ID NO: 3, residue 15.

6. (Restated) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 55, as represented by SEQ ID NO: 3, residue 16.

7. (Restated) The RecA homolog protein mutant of claim **1**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 59, as represented by SEQ ID NO: 3, residue 20.

15. (Restated) In an *E. coli* RecA protein or a protein having a MAW motif homologous to the *E. coli* MAW motif, a manufactured RecA homolog protein mutant, wherein a naturally occurring amino acid residue located within the protein's homolog of *E. coli* residues 40 to 65, shown in SEQ ID NO: 3, inclusive, but excluding the protein's homolog of *E. coli* residues 47 and 51 (SEQ ID NO: 3, residues 8 and 12), is replaced with a replacement aromatic amino acid residue.

16. (Restated) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 40, as represented by SEQ ID NO: 3, residue 1.

17. (Restated) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 42, as represented by SEQ ID NO: 3, residue 3.

18. (Restated) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 44, as represented by SEQ ID NO: 3, residue 5.

19. (Restated) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 50, as represented by SEQ ID NO: 3, residue 11.

20. (Restated) The RecA homolog protein mutant of claim **15**, wherein said replacement occurs at the protein's homolog of *E. coli* residue 56, as represented by SEQ ID NO: 3, residue 17.

27. (Restated) In an *E. coli* RecA protein or a protein having a MAW motif homologous to the *E. coli* MAW motif, a manufactured RecA homolog protein mutant, wherein a naturally occurring amino acid residue located at the protein's homolog of *E. coli* residues 47 or 51, shown in SEQ ID NO: 3, (residues 8 or 12), is replaced with a tryptophan residue.

The Rejection Under 35 U.S.C. § 112, 1st Paragraph

The Examiner rejected claims 1-27 on the basis that only four representative species are described in the application. Applicant respectfully traverses this rejection, because description of the invention only by representative species is not required, and because those of skill in the art could replicate the invention in a straightforward fashion based on the information provided in the specification.

Specifically, the invention is described as replacement of specific residues at specific locations in an *E. coli* homolog protein with residues which are volumetrically larger than the replaced residues. Because the volumetric sizes of the limited number of available residues are known, one of skill in the art would be able to: (1) identify a location at which the residue is to be replaced, as described in the claims; (2) identify the residue to be replaced; (3) select a residue of greater volumetric size with which to replace the naturally-occurring residue; and (4) perform the steps necessary to accomplish the replacement.

Accordingly, the invention is not merely described or claimed as a "genus" which can only be identified by representative species. Even in those types of cases, it is unnecessary to "enumerate a plurality of species if a genus is sufficiently identified in an application by 'other appropriate language.'" *University of California v. Eli Lilly & Co.*, 43 U.S.P.Q.2d 1398, 1406 (Fed. Cir. 1997),

*cert. denied*, 140 L.Ed.2d 695 (1998). In this case, the invention is specifically identified by appropriate language in the claims. Therefore, Applicant respectfully traverses this rejection and submits that claims 1-27 are in condition for allowance.

The Rejection Under 35 U.S.C. § 112, 2nd Paragraph

The Examiner rejected claims 1-27 under 35 U.S.C. § 112, second paragraph, as being indefinite because the claims are directed to SEQ ID NO: 1. The claims have been amended to specifically reference the residues in the consensus MAW motif (SEQ ID NO: 3) which would be replaced in practicing the claims. Accordingly, Applicant requests that the rejection under 35 U.S.C. § 112, second paragraph, be withdrawn.

The Rejections Under 35 U.S.C. § 102

The Examiner has rejected claims 1, 2, 4, 7, 8, 9, 14, 15, 16, 21, and 22 under 35 U.S.C. § 112 because the "claims encompass any mutant including naturally occurring RecA protein mutants." Independent claims 1, 15, and 27 are amended to insert the word "manufactured" in the phrase "a manufactured RecA homolog protein mutant", to insure that it is clear that the claims are drawn only to an artificially created mutant and not to any naturally-occurring proteins. Support for this amendment is found in the specification at pages 15-20, in which the process of creating the mutants of this invention is described. Accordingly, Applicant submits that the claims do not encompass any naturally-occurring proteins, and submits that claims 1-27 are in condition for allowance.

Conclusion

Applicant respectfully submits that claims 1-27 are in condition for allowance and requests that the Examiner issue a Notice of Allowance of these claims.

Respectfully submitted,

Date: 3/30/01

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CERTIFICATE OF MAILING VIA EXPRESS MAIL UNDER 37 C.F.R. § 1.10

I hereby certify that the above **Response to Fourth Office Action** is being mailed to the Assistant Commissioner of Patents, Washington, D.C. 20231, via the United States Postal Service Express Mail, on the 30th day of March, 2001.

Express Mail No.: EL115659724US